

PATENT COOPERATION TREATY

REC'D 26 DEC 2004

From the
INTERNATIONAL SEARCHING AUTHORITY

WIPO PCT

PCT

To:

see form PCT/ISA/220

16/10/03

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2004/026349

International filing date (day/month/year)
12.08.2004

Priority date (day/month/year)
28.09.2003

International Patent Classification (IPC) or both national classification and IPC
H04L25/02

Applicant
QUALCOMM INCORPORATED

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2004/026349

Box No. 1 Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2004/026349

Box No. II Priority

1. ☒ The following document has not been furnished:

- ☒ copy of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(a)).
☐ translation of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43bis.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. ☐ It has not been possible to consider the validity of the priority claim because a copy of the priority document was not available to the ISA at the time that the search was conducted (Rule 17.1). This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.
4. Additional observations, if necessary:

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	12-18, 30-36, 48-54
	No: Claims	1-11, 19-29, 37-47
Inventive step (IS)	Yes: Claims	12-18, 30-36, 48-54
	No: Claims	1-11, 19-29, 37-47
Industrial applicability (IA)	Yes: Claims	1-54
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V.

- 1 The following documents are referred to in this communication:
D1 : WO 02/05442 A (HARRIS CORP) 17 January 2002 (2002-01-17)
D2 : TENG JOON LIM: "Bias in CDMA channel estimates with the use of short spreading sequences" IEEE, vol. 1, 6 September 2000 (2000-09-06), pages 288-291, XP010517569

2 INDEPENDENT CLAIMS 1, 19, 37

- 2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT.

Document D1 discloses (the references in parenthesis applying to this document):

A method of estimating a communication channel impulse response $h(t)$, comprising the steps of:
generating a data sequence d_i (six symbol dwell pattern mentioned on page 10 lines 5 to 34) having a constrained portion Cd_i (symbols d_1 to d_4) associated with at least two codes w_0, w_1 (in the case the pattern -1, -1, +1, +1 is used as symbols d_1 to d_4 , as mentioned on figure 11), wherein a correlation $A_{code}(k)$ of the constrained portion Cd_i with one of the codes w_0, w_1 is characterized by a maximum value at $k=0$ less than maximum values at $k \neq 0$;
generating a chip sequence c_i having a chip period T_c as the data sequence d_i spread by a spreading sequence S_i of length N (page 6, lines 16-18);
generating $co_m(t) = co(t + mNT_c)$ for $m=0, 1, \dots, M$ by correlating a received signal $r(t)$ with the spreading sequence S_i , wherein the received signal $r(t)$ comprises the chip sequence c_j applied to the communication channel (page 7, lines 12-18); and
generating an estimated communication channel impulse response $h_m(t)$ as a combination of $co_m(t)$ and d_m for $m=0, 1, \dots, M$ (page 10 lines 5 to 34).

Therefore the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT.

- 2.2 The same objection applies to independent claim 37, which is the corresponding claim in another category, combined with the fact that the use of a correlator and

estimator in Document D1 is implicit. Concerning claim 19, which contains all the features of claim 37, and which is therefore virtually dependent on the latter, the same objection applies as well. Consequently, the subject-matter of claims 19 and 37 is not new in the sense of Article 33(2) PCT.

3 DEPENDENT CLAIMS 2-11, 20-29, 38-47

Dependent claims 2-11, 20-29, 38-47 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step (Article 33(2) and (3) PCT).

- 6** A suggestion for overcoming the above objections would consist in precisising the link between the data sequence d_i and the estimator used. Paragraphs 60 and 61 seem to contain the desired matter.